.

This Document/SOP Covers Method(s):

- EPA 160.3
- SM 2540B

This Document/SOP Replaces:

- ***Document ID240 version 1.01***

Changes from Preceding Version:

- ***Made changes to incorporate the GAP assessment findings.***
- ***Typing errors.***
- ***Changes are noted in bold & italic***

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## Scheduled Review

QA REVIEW (BY AND DATE)

TECH. REVIEW (BY AND DATE)

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# 1. SCOPE AND APPLICATION

## 1.1 Analytes

This standard operating procedure (SOP) determines the total solid (TS) content of a sample.

## 1.2 Quantitation Limits

The quantitation limit (QL) is **10 mg/L** if a 100mL sample aliquot is used.

## 1.3 Applicable Matrices

This SOP may be applied to all aqueous samples.

## 1.4 Dynamic Range

*Not Applicable*

## 1.5 Approximate Time

The analysis of one batch of twenty (20) samples will take approximately twelve (24) hours including drying time.

# 2. METHOD SUMMARY

A sample aliquot is weighed in clean pre weighed ***beaker.*** The sample is then dried to a constant weight at 103-105°C. The TS is then calculated based upon initial and final weights of the holding ***beaker***.

# 3. DEFINATIONS

NA

# 4 INTERFERENCES

**4.1** Excessive residue in the ***beaker*** may trap moisture giving an inaccurate dry weight. It is suggested that the total residue be limited to approximately 200mg. A smaller aliquot may be used and diluted, if necessary.

**4.2** Waters with high mineral content may require extended drying times. These samples will be difficult to reach a constant weight; they should be minimally handled and weighed quickly.

# 5 SAFETY

## 5.1. Standard Safety Procedures

**5.1.1** Due to various hazards in the laboratory, safety glasses, gloves, and laboratory coats must be worn at all times. In addition, goggles and fume hoods should be utilized when dealing with toxic, caustic, and flammable chemicals.

**5.1.2** Make sure to be familiar with all safety facilities and equipment prior to initiating this procedure.

## 5.2. Health

The toxicity and carcinogenity of each sample will most likely not be known. Therefore, it is imperative that each sample be handled as a potential health hazard. Proper handling procedures as described in 4.1. should be used.

## 5.3 Concerns

Please address any further health and safety concerns to the Health and Safety Officer or the Quality Assurance Manager (QAM) prior to initiating this procedure.

## 6 EQUIPMENT AND SUPPLIES

**6.1.** Beaker ï capable of holding approximately 200mg

**6.2.** Glass fiber filters ï size to securely fit in the filtration device (6.1.)

**6.3.** Drying oven ï capable of maintaining ***103°C ± 2***

**6.4.** Analytical balance ï accurate to 0.001g

**6.5.** Desiccator

**6.7** Graduated cylinder ï 100mL

## 7 REAGEANTS AND STANDARDS

**7.1.** Deionized (DI) water , ***ASTM II type or higher.***

## 8 SAMPLE COLLECTION, PRESERVATION, AND STORAGE

### 8.1 Sample Collection and Container

A plastic or glass 250mL or larger container should be used to collect the sample.

### 8.2 Preservation

The samples shall be stored at 4°C ± 2 from the time of sampling.

### 8.3 Holding Time

The samples shall be analyzed within seven (7) days of sampling.

## 9 QUALITY CONTROL

**9.1.** The method blank must have a concentration of ≤ ½ the QL (*i.e.* usually ≤ 5mg/L). It should be analyzed once within every batch of not more than twenty (20) samples.

**9.2.** A sample duplicate should be prepared and analyzed with every batch of not more than twenty (20) samples. The RPD between the original sample and its duplicate shall be within ±20%.

**9.3.** Samples that require dilution due to high solid content shall be indicated in the logbook.

## 10 CALIBRATION AND STANDARDIZATION

NA

## 11 PROCEDURE

### 11.1 Beaker Preparation

***11.1.1*** **The beaker shall be thoroughly washed and dried at 103°C ± 2, *for minimum of 1 hour.***

**11.1.2** They should be allowed to cool in the desiccator.

**11.1.3** Weigh the ***beaker*** immediately prior to adding the sample. Record the weight in the logbook. (*See Figure 1 for an example logbook page*.)

**11.2** Transfer 100mL of sample to the pre weighed ***beaker.***

**11.3** For the method blank, use 100mL of DI water.

**11.4** For dilutions, record the volume of the actual sample aliquot. Raise the volume to 100mL with DI water.

**11.5** Place the ***beaker*** in the oven at 103-105°C for six to ten (6-10) hours. The sample liquid should completely evaporate prior to oven removal.

**11.6** After evaporation, place the sample residue and ***beaker*** in the Desiccator to cool.

**11.7** Weigh the sample residue and crucible and record the weight.

**11.8** Repeat the heating, drying, cooling & weighing cycle.

**11.9** Re-weigh the sample and crucible and record the weight. If the results are not within 0.01g of each other, repeat 11.5 and 11.6 until this requirement is met.

**11.10** Determine the concentration using the equation in Section 12.

## 12 DATA ANALYSIS & CALCULATIONS

TS in mg/L

$$\frac{(O - C)\,(1000)}{V} = TS\ (mg/L)$$

where,
O is the constant weight of the oven-dried sample and crucible (mg)
C is the weight of the crucible before adding the sample filtrate (mg)

V is the volume of sample aliquot used (mL)

## Reporting

**12.1.** The result is reported in mg/L.

**12.2.** Total Suspended solids are reported to three (3) significant figures.

# 13 QA/QC Requirements

## Corrective Actions

**13.1** Samples that do not reach a constant weight should be noted. Dilution may be required.

**13.2** If a method blank does not meet the requirement in 9.1, then all associated samples shall be re-analyzed.

**13.4** If the requirements for the sample duplicate listed in 9.3 are not met, the associated samples shall be re-analyzed. If the discrepancy persists, the situation shall be discussed in the case narrative and, if applicable, the data will be flagged.

**13.5** All nonconformance occurrences, including failed QC sample analyses, shall have a Corrective Action Report (CAR) submitted to the Quality Assurance Manager. The investigation, corrections and preventative actions shall stem from this document. All nonconformance issues shall be addressed in the case narrative.

# 14 WASTE MANAGEMENT

Good safety habits and laboratory techniques should be used throughout the procedure. Consult the Material Safety Data Sheet (MSDS) for information specific to the reagent used.

## 15 REFERENCES

**15.1** Methods for Chemical Analysis of Water and Wastes EPA 160.3

## 16 TABLES & ATTACHMENTS

**Figure 1.** TS Example Logbook Page